

Candidate's Name:

Signature:

Centre No.				Personal No			
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(Do not write your School Name anywhere on this booklet.)

456/1
MATHEMATICS
Paper 1
July/Aug. 2024
2 $\frac{1}{4}$ hours



UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Certificate of Education

MATHEMATICS

Paper 1

(Set B)

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of two sections; A and B. It has six examination items.

Section A has two compulsory items.

Section B has two parts; I and II. Answer one item from each part.

Answer four examination items in all.

Any additional item(s) answered will not be scored.

All answers must be written in the spaces provided.

Graph Paper is provided.

Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.

SECTION A

Answer all items in this section.

Item 1.

Alice is supposed to pay 4,500,000 shillings per year at the University. This amount is divided in the ratio 4:3:3 for her fees, accommodation and meals respectively. She is supposed to pay 60 % of the fees in the first instalment, pay $\frac{1}{3}$ of the remainder of the fees in the second instalment and the rest of the fees in the third instalment.

Alice is supposed to get the money for fees from a mobile money agent using a 4-digit code. For safety reasons, her father gave her the code written as 234 in base ten and Alice has to convert this code to base six to get the actual code.

Task:

- (a) How much will Alice pay for fees in the last instalment?
- (c) How much money will Alice pay for accommodation?
- (c) Help Alice to determine the actual code for withdrawing the money from the mobile money agent.

Item 2.

Your parents have given you the following instructions to make juice for sale while ensuring minimum costs of production. The juice should consist of passion fruits and oranges and you should start with a total of at most 25 fruits.

In order to make very good juice, you should make sure that the difference between the number of passion fruits and oranges is at least 4. The number of oranges must not be less than 5.

Each passion fruit costs Shs300 and an orange costs Shs200.

Task:

- (a) Express the conditions for making juice as inequalities.
- (b) (i) Show the feasible region of the conditions on the cartesian plan.
(ii) Determine the number of passion fruits and oranges you should use to minimise the cost of production.

SECTION B

This Section has two Parts; I and II

Part I

Answer one item from this part

Item 3.

Learners visited a factory making biscuits. The manager showed them records of the masses of biscuits produced by the factory as in the table below.

Mass (g)	100 - 109	110 - 119	120 - 129	130 - 139	140 - 149	150 - 159	160 - 169
Number of biscuits	1	3	11	21	8	4	2

When the learners asked the manager about the value of the mass below which half of the biscuits produced lie he was not so certain of the actual value.

Task:

Help the manager to estimate the value of the mass below which half of the biscuits lie.

Item 4.

Simon sells ice cream in schools and the ice cream is of three flavours; chocolate, vanilla and strawberry. He wants to introduce the same business in your school. He knows that for the business to succeed, the probability that the learners will take at least two of the flavours should be greater than 0.5

He is uncertain of his business success in your school. The study you have carried out in your school indicates that 158 learners like chocolate flavour, 130 like vanilla, and 188 like straw berry.

40 learners like chocolate and vanilla, 80 like straw berry and vanilla, 88 like chocolate and straw berry and 10 like none of the three flavours.

The number of learners who like all the three flavours is equal to the number of those who like chocolate and vanilla only.

Task:

Using the data from your study, do you advise Simon to introduce the business in your school? Give a reason for your advice.

Part II

Answer one item from this part.

Item 5.

Juma is tasked to take company goods from a factory to three trading centres.

The car he is going to use has 20 litres of fuel and it uses 1 litre of fuel for every 15 km. He left the factory to the first trading centre which is 70 km away on a bearing of $N 60^\circ E$. He then moved Eastwards at an average speed of 60 km/hr for 30 minutes to the second trading centre. From this centre he took a bearing of 200° and moved a distance of 50 km to the third trading centre.

At this centre he was shown a direct-route that would take him back to the factory but was not sure whether the remaining fuel in the car was enough for that journey since he did not know the distance.

Task:

- (a) Help Juma to determine;
- (i) the distance of the direct route from the third trading centre to the factory.
 - (ii) whether the remaining fuel in the car will be enough for journey using the direct route.

Item 6.

Mariam has a room that she plans to use as a hair salon. She has wall paper of 4.7 m^2 . The wall she plans to cover with paper is 240 cm by 300 cm. She knows the wall paper she has is not enough. So she needs your advice on how much more she should buy. A roll of 10 m^2 of wall paper is sold at shillings 32,000/=

She also plans to use three employees and pay each of her three employees a gross monthly salary of shillings 350,000. The gross monthly salary includes a non-taxable transport allowance of shillings 90,000. However, before she pays them, she has to deduct income tax as a requirement by the tax authority. The tax bands are shown in the table below.

Monthly taxable income (shillings)	Tax Rate (%)
0 – 100,000	0
100,001 – 200,000	5
200,001 – 300,000	15

Mariam is having difficulty in using the tax bands.

Task:

- (a) (i) How many more square metres of wall paper should Mariam buy?
(ii) How much will she pay for the extra wall paper
- (b) (i) What is the total amount of income tax Mariam will deduct from her employees?
(ii) How much will she pay each of the employees as net salary?